

What is claimed is:

1. A wellhead assembly for use on a well with a blowout preventer stack having a bore therethrough, comprising:

5 a wellhead housing, said wellhead housing adapted to suspend at least one casing string therein, and seal the annulus between said wellhead housing and said at least one casing string;

10 a spool tree sealingly secured to the upper end of said wellhead housing, said spool tree having a bore therethrough adapted to receive a tubing hanger therein and seal thereabout, said spool tree having at least one lateral port communicating with a valve sealingly secured to the exterior of said spool tree;

15 a tubing hanger sealingly secured within said spool tree at a prearranged angular orientation, said tubing hanger having at least one tubing bore therethrough and at least one lateral port connected to said tubing bore, said tubing hanger lateral port aligned with said at least one lateral port of said spool tree, said tubing hanger having a tubing string suspended therefrom;

20 an intervention spool sealingly secured to the upper end of said wellhead housing, said intervention spool having a bore therethrough adapted to receive a valve assembly having a plurality of valves arranged therein, said valves having a bore concentric with said tubing hanger, said valve assembly valves being operable by a plurality of valve actuators positioned on the exterior of said intervention spool; and,

a blowout preventer stack positioned above and sealingly secured to said intervention spool, said blowout stack having a bore substantially equal to the bore of said intervention spool.

25 2. A wellhead assembly for use on a well with a blowout preventer stack having a bore therethrough according to Claim 1, further comprising:

a landing string attached to said valve assembly for lowering said valve assembly into said intervention spool; and,

an umbilical line attached to said valve assembly to allow selective actuation of said valves in said valve assembly.

3. A wellhead assembly for use on a well with a blowout preventer stack having a bore therethrough according to Claim 2, further comprising:

5 a seal sleeve sealingly secured to the lower end of said spool tree, said seal sleeve extending into said wellhead housing and sealing said wellhead to casing annulus when said spool tree is secured to said wellhead housing.

4. A wellhead assembly for use on a well with a blowout preventer stack having a bore therethrough according to Claim 3, wherein:

said spool tree has a plurality of lateral ports,

10 said tubing hanger includes a plurality of tubing bores therethrough, said tubing bores laterally displaced from one another and axially aligned with a plurality of tubing strings suspended from said tubing hanger; said tubing bores having a one lateral port connected thereto, said tubing hanger lateral ports aligned with said plurality of lateral ports of said spool tree;

15 said intervention spool valve assembly having a plurality of bores therethrough, said plurality of bores aligned with said tubing hanger bores, said intervention spool valve assembly plurality of valves arranged to form at least one closure member for each of said bores, said valve assembly valves being operable by a plurality of valve actuators positioned on the exterior of said intervention spool.

20 5. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, comprising:

a wellhead housing, said wellhead housing adapted to suspend at least one casing string therein, and seal the annulus between said wellhead housing and said at least one casing string;

25 a spool tree sealingly secured to the upper end of said wellhead housing, said spool tree having a bore therethrough adapted to receive a tubing hanger therein and seal thereabout;

a tubing hanger sealingly secured within said spool tree at a prearranged angular orientation, said tubing hanger having at least one tubing bore therethrough, said tubing hanger having a tubing string suspended therefrom;

30 an intervention spool sealingly secured to the upper end of said wellhead housing, said intervention spool having a bore therethrough adapted to receive a valve assembly

having a plurality of valves arranged therein, said valves having a bore concentric with said tubing hanger, said valve assembly valves being operable by a plurality of valve actuators positioned on the exterior of said intervention spool to selectively control well production fluid flow therethrough; and,

5 a blowout preventer stack positioned above said intervention spool, said blowout stack having a bore substantially equal to the bore of said intervention spool, said blowout preventer stack having a hub formed on its lower end; and,

 said intervention spool having a remotely operable connector on its upper end for sealing engagement with said hub of said blowout preventer stack.

10 6. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, according to Claim 5, further comprising:

 a landing string attached to said valve assembly for lowering said valve assembly into said intervention spool; and,

15 an umbilical line attached to said valve assembly to allow selective actuation of said valves in said valve assembly.

 7. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, according to Claim 6, further comprising:

20 a seal sleeve sealingly secured to the lower end of said spool tree, said seal sleeve extending into said wellhead housing and sealing said wellhead to casing annulus when said spool tree is secured to said wellhead housing.

 8. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, according to Claim 7, further comprising:

25 said tubing hanger includes a plurality of tubing bores therethrough, said tubing bores laterally displaced from one another and axially aligned with a plurality of tubing strings suspended from said tubing hanger;

30 a tubing hanger adapter positioned above said tubing hanger, said tubing hanger adapter having a plurality of bores therethrough, said plurality of tubing hanger adapter bores aligned with said tubing hanger bores and sealed thereto;

5 said intervention spool valve assembly having a plurality of bores therethrough, said plurality of bores aligned with said tubing hanger bores and said tubing hanger adapter bores, and sealed to said tubing hanger adapter bores, said intervention spool valve assembly plurality of valves arranged to form at least one closure member for each of said bores, said valve assembly valves being operable by a plurality of valve actuators positioned on the exterior of said intervention spool.

9. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, comprising:

10 a wellhead housing, said wellhead housing adapted to suspend at least one casing string therein, and seal the annulus between said wellhead housing and said at least one casing string;

 a spool tree sealingly secured to the upper end of said wellhead housing, said spool tree having a bore therethrough adapted to receive a tubing hanger therein and seal thereabout;

15 a tubing hanger sealingly secured within said spool tree at a prearranged angular orientation, said tubing hanger having at least one tubing bore therethrough, said tubing hanger having a tubing string suspended therefrom;

20 an intervention spool sealingly secured to the upper end of said wellhead housing, said intervention spool having a bore therethrough adapted to receive a valve assembly having a plurality of valves arranged therein, said valves having a bore concentric with said tubing hanger, said valve assembly valves being operable by a plurality of valve actuators positioned on the exterior of said intervention spool to selectively control well production fluid flow therethrough; and,

25 a riser positioned above said intervention spool, said riser having a bore substantially equal to the bore of said intervention spool, said riser having a hub formed on its lower end; and,

 said intervention spool having a remotely operable connector on its upper end for sealing engagement with said hub of said riser.

10. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, according to Claim 9, further comprising:

5 a landing string attached to said valve assembly for lowering said valve assembly into said intervention spool; and,

an umbilical line attached to said valve assembly to allow selective actuation of said valves in said valve assembly.

10 11. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, according to Claim 10, further comprising:

a seal sleeve sealingly secured to the lower end of said spool tree, said seal sleeve extending into said wellhead housing and sealing said wellhead to casing annulus when said spool tree is secured to said wellhead housing.

15 12. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, comprising:

a wellhead housing, said wellhead housing adapted to suspend at least one casing string therein, and seal the annulus between said wellhead housing and said at least one casing string;

20 a spool tree sealingly secured to the upper end of said wellhead housing, said spool tree having a bore therethrough adapted to receive a tubing hanger therein and seal thereabout;

a tubing hanger sealingly secured within said spool tree at a prearranged angular orientation, said tubing hanger having at least one tubing bore therethrough, said tubing hanger having a tubing string suspended therefrom;

25 an intervention spool sealingly secured to the upper end of said wellhead housing, said intervention spool having a bore therethrough adapted to receive a valve assembly having a plurality of valves arranged therein, said valves having a bore concentric with said tubing hanger, said valve assembly valves being operable by a plurality of valve actuators positioned on the exterior of said intervention spool to selectively control well
30 production fluid flow therethrough; and,

a production riser positioned above said intervention spool, said riser having a

bore substantially equal to the bore of said tubing hanger, said production riser having a hub formed on its lower end; and,

said intervention spool having a remotely operable connector on its upper end for sealing engagement with said hub of said production riser.

5 13. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, according to Claim 12, further comprising:

a landing string attached to said valve assembly for lowering said valve assembly into said intervention spool; and,

10 an umbilical line attached to said valve assembly to allow selective actuation of said valves in said valve assembly.

14. An apparatus for use on a well with a blowout preventer stack having a bore therethrough to selectively control the flow of fluids from said well, according to Claim 13, further comprising:

15 a seal sleeve sealingly secured to the lower end of said spool tree, said seal sleeve extending into said wellhead housing and sealing said wellhead to casing annulus when said spool tree is secured to said wellhead housing.